



**SOUTH WINDSOR DEPARTMENT OF
PUBLIC WORKS
POLLUTION CONTROL DIVISION**



**SANITARY SEWER EASEMENT
VEGETATION MANAGEMENT PLAN
2015**

Summary

South Windsor Department of Public Works, Pollution Control Division (DPW) has prepared this Vegetation Management Plan (VMP) to serve as a guide for the public, federal, state and municipal officials, vegetation management contractors and South Windsor DPW personnel. It is the principle document in a set of companion resources that will guide all vegetation maintenance activities on the sanitary sewer easement rights-of-way (ROW).

The DPW is adopting an Integrated Vegetation Management program (IVM—arboricultural Integrated Pest Management, IPM) to manage vegetation on sections of the ROW that require specific vegetative conditions for safety and access. The DPW's primary goal is to establish a long-term selective IVM program that establishes early successional ecological communities of grasses and herbaceous plant species on these ROWs that benefit both the citizens of South Windsor and native wildlife.

This program will be initiated in four phases within four defined areas of town. The first phases will primarily establish the desired low growing plants. In some areas, this involves maintaining the existing ROW conditions in others it involves removing trees, vines and invasive plant species. Due primarily to the dense populations of invasive plants such as Oriental Bittersweet vines the resulting landscape will immediately be cleaner and less cluttered. Over the long-term, the goal is to control these undesirable, incompatible vegetation types using the most selective treatment methods possible on regular treatment cycles (schedules) that minimize the need for more intensive maintenance operations.

For inquiries please contact the Pollution Control Division at 1540 Sullivan Avenue, South Windsor, CT 06074, (860) 644-2511, x 243.

The requirements set forth in this VMP:

1. Are based on the results of an IVM survey performed by *ISA Certified Arborists*
2. Apply to routine maintenance
3. Are not intended for emergency maintenance and repair activities
4. Are not intended for municipal school property(s)
5. Will be supervised by DPW personnel or their designated representatives to ensure all guidelines are followed
6. Will only be carried out by appropriately qualified, certified maintenance crews
7. Will result in a fully implemented IVM program.

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SECTION 1.0: INTRODUCTION

Founded as part of a larger Windsor, Connecticut in the 17th century, South Windsor was incorporated in 1845. In area, the town contains 28.7 square miles of land and water. Currently, the town is a combination of industry, commercial districts, farming and a growing number of suburban neighborhoods with a population of a little over 25,000 residents.¹

To serve this expanding population, South Windsor has miles of sanitary sewer pipeline rights-of-way easements (ROW) with an average width of twenty feet. During the construction of this modern convenience, where the pipe does not run through municipal property, the town duly negotiated easements. To maintain these ROWs, protect the pipe from damage and protect our citizens from emergencies and service disruptions, the South Windsor DPW, Pollution Control Division (DPW) has prepared this Vegetation Management Plan (VMP).

This VMP is based on an Integrated Vegetation Management (IVM) approach developed, utilized and continuously evolved over the past fifty-years. These well-established arboricultural practices take into consideration the natural resources along the rights-of-way and the cultural use of the landscape by town residents.

The primary objective of this VMP is, therefore, to document the most appropriate practices and procedures to control incompatible vegetation in a program that, over time, minimizes the need for and impact of vegetation maintenance activities. Within this plan there

¹Lori Jean Kremidas. "The History of South Windsor Connecticut: Settlement to Incorporation 1634 – 1845," Historiography, March 25, 1981 (Dr. Hebert Photos by Debbie Kimball); U. S. Bureau of the Census, "2010 U.S. Census" <http://www.census.gov/2010census/data/> (accessed February 2015).

are guidelines for how the ROW vegetation will be maintained to protect the pipe. In addition to its role in obscuring the ROWs, woody vegetation with strong root systems can potentially infiltrate pipe joints, cause clogs or even breach the pipes. For these reasons, maintaining the appropriate landscape is a vital part of fulfilling state, municipal and federal laws.

To achieve this goal, the primary ecological communities the DPW is establishing, encouraging and supporting on these ROWs must primarily consist of grasses and herbaceous vegetation. There are many types of acceptable early successional plant communities on these ROWs. For examples, cross-country sections of the pipeline will be maintained by the town as early successional ecological communities of native plants that support the habitat of a wide variety of native species. Other areas will include lawns, fields, wildflower patches or other compatible plantings. In all cases, once established these low growing landscapes will help reduce the need for more intensive maintenance activities. Also in all cases, these landscapes are easier to re-establish in cases where the DPW needs to access the pipe.

SECTION 2.0: INTEGRATED VEGETATION MANAGEMENT

The DPW's IVM program is based on well-established standards for managing vegetation following the *The International Society of Arboriculture's* (ISA) Best Management Practices: Integrated Vegetation Management and *American National Standards Institute's* (ANSI) ANSI A300 Standards: Integrated Vegetation Management. The structured decision making processes involved in implementing the industry standards was generated by Christopher A. Nowak and Benjamin D. Ballard along with the following adaptation of their diagram²:

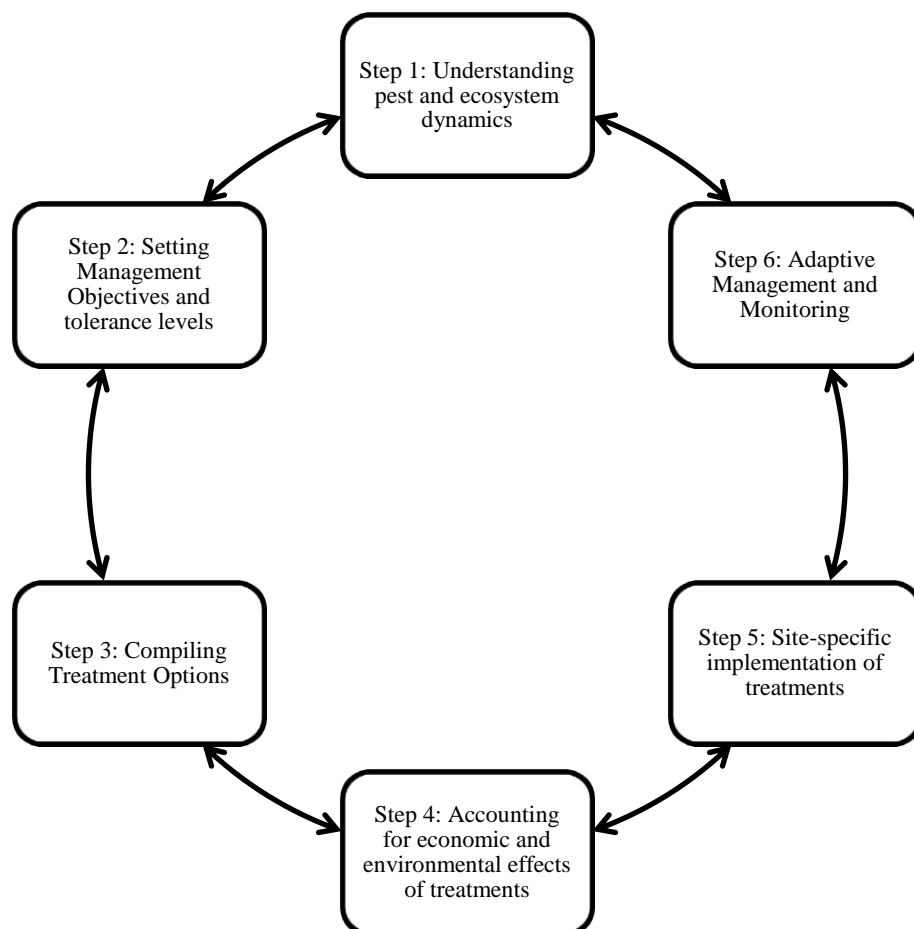


Illustration 1: Variation of Nowak and Ballard's Framework for IVM

By following this framework, the DPW has created an IVM program suited to the particular

²Christopher Nowak and Benjamin D. Ballard. "A Framework for Applying Integrated Vegetation Management on Rights-of-way," Journal of Arboriculture 31 (1), January 2005: 28-37.

requirements of managing vegetation on its ROWs. One meaning of Step 1 is understanding the need to establish appropriate vegetation conditions on the ROW (or, removing incompatible vegetation). Step 2 is the decision on the part of the DPW to implement a vegetation management program to make these ROWs safer for the public and DPW personnel. Step 3 is where the DPW made the decision to implement an IVM program instead of choosing a one-time, one-treatment type program that *does not* have the flexibility to accommodate diverse situations. As a result, this IVM program is carefully designed to increase the overall effectiveness of vegetation management activities, and to reduce the environmental impact and financial cost of vegetation maintenance.³

IVM itself is the choice of combining appropriate “Treatment Options” (Step 3) for the appropriate locations (Step 5). To be IVM, these treatment option need to work together to maximize the unique advantages, while minimizing the disadvantages of each option or component. It is more than Step 3 & 5, however, as the component parts of the DPW’s IVM program are selected based on Steps 1, 4 & 6. As a result, this IVM program is able to adapt over time to new landscapes and new technologies.

Taking this decision making process into consideration, along with the evidence from long term New England IVM programs, the DPW has put together a combination of mechanical, chemical, natural/biological and cultural components to manage its ROWs (see Illustration 2).

Guided by cultural norms, mechanical and chemical controls are the primary direct IVM treatment methods used to remove targets. Appropriate use of these controls (removals, trimming, mowing, and hand cutting mechanical methods and foliar, cut-surface and basal herbicide applications) supports natural controls. In turn, natural controls lower the dependence on chemical and mechanical controls. Long term natural controls, however, are only sustainable through the continued use of selective chemical and mechanical controls.

³Goodrich-Mahoney, John W.; Abrahamson, Lawrence, P.; Ballard, Jennifer I.; Tikalsky, Susan M. 8th International Symposium Environmental Concerns in Rights-of-Way Management, 2004; International Society of Arboriculture. Best Management Practices: Integrated Vegetation Management. ISA, 2007; American National Standards Institute. ANSI A300 Standards: Integrated Vegetation Management. ANSI, 2006.

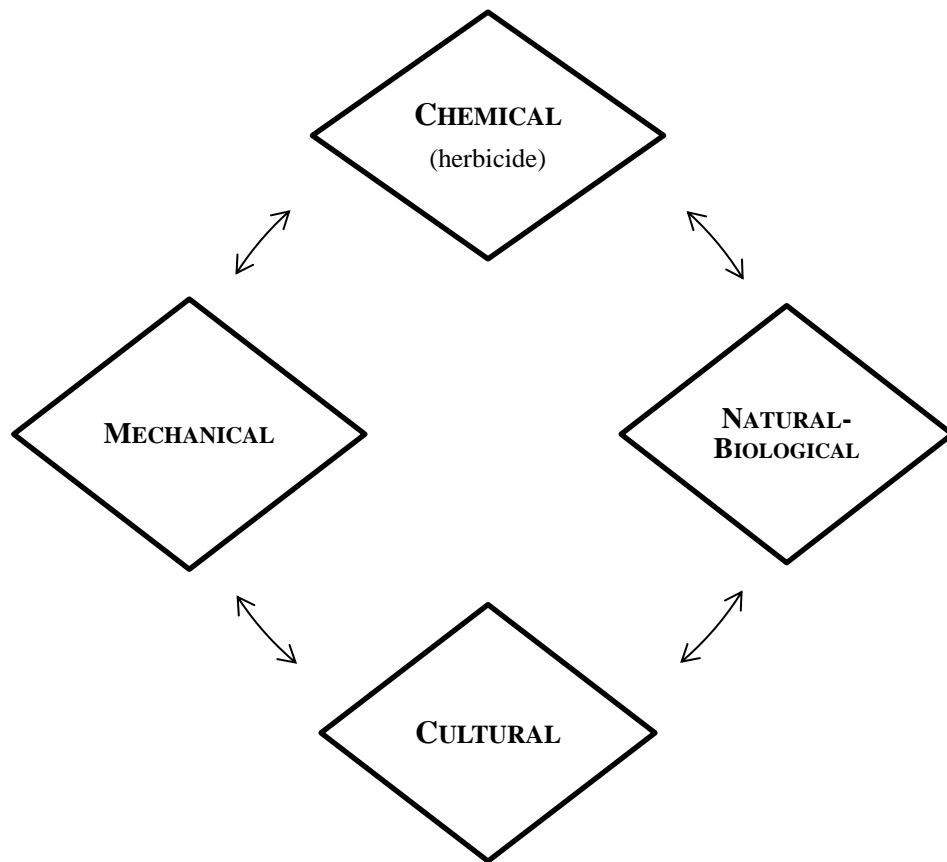


Illustration 2: Integrated Vegetation Management

This IVM program is by design, an environmentally responsible means of intentionally managing ecological succession by discouraging the establishment of and when necessary removing certain types of vegetation that interfere with the ROWs, pipe and manhole covers. Plant life is by its nature unstable, it is, however, governed by relatively predictable processes of change in composition, or structure that interact with the wildlife species it supports. This is known as ecological succession. In New England, succession strives towards the climax forest, but is interrupted by disturbances (from natural and human causes). Understanding the mechanism of this process, this IVM program provides intentional disturbances that mimic natural disturbances that support the desired stable native ecological communities necessary to allow the DPW to maintain its facilities.

In other words, natural controls on these right-of-ways are ecological communities of primarily herbaceous plants and grasses. These low growing plant communities inhibit the germination and growth of woody seedlings through competition (for light, moisture,

nutrients), wildlife depredation (browsing/feeding) and possibly by allelopathy.⁴

Some IVM programs use the term “biological controls” for “natural controls.”

Biological controls, however, are more commonly defined according to Cornell University as:

....the reduction of pest populations by [introducing] natural enemies....Keep in mind that all insect...[and plant] species are also suppressed by naturally occurring organisms and environmental factors, with no human input. This is frequently referred to as natural control....Biological control of weeds includes insects and pathogens.⁵

The use of mechanical and chemical controls to support early successional ecological communities is not the use of “natural” enemies such as insects and pathogens. Instead, since the “human input” in IVM is actually commonly considered a “disturbance” in ecological succession it is not what is meant by “human input.” Nor, are there any biological controls currently available to control the primary target/incompatible vegetation found on the ROWs in question. Therefore, the DPW will concentrate its efforts on supporting “naturally occurring” controls. As the relatively new field of biological controls advances, however, the DPW is not ruling out the use of biological controls on an experimental basis such as in conjunction with a university study.

In a similar vein, other programs insert the term “cultural” in the place of “natural” using the term cultural in its ancient agricultural definition of “cultivating crops.” This VMP is reserving the term cultural for its broader more well-known definition of “...relating to human customs, art and society” or more specifically in this case to how humans use, view and shape the physical world. In a municipal VMP in which the ROWs are in neighborhoods, through yards, along streets, in industrial and commercial areas and in cultivated fields, the DPW must take into consideration the built environment when planning vegetation management activities. To clarify with a simple example, while a well-mowed lawn might remove the need for additional treatment methods, the town still needs to be able to identify the manhole covers and needs to monitor any changes in the maintenance of the property over time.

⁴W.C. Bramble, W.R. Burns, R.J. Hutnik and S.A. Liscinsky, “Interference Factors Responsible for Resistance of Forb-Grass Cover Types to Tree Invasion on an Electric Utility Right-of-Way,” *Journal of Arboriculture* Vol. 22 No. 2, March 1996: 99-105.

⁵Cornell University, Entomology Department Fact Sheet: <http://www.biocontrol.entomology.cornell.edu/what.html>.

This also plays into cultural beliefs about landscape aesthetics. This is particularly important during the first phase of treatments in locations where 40 plus years of tree, shrub and invasive plant species need to be cleared to re-establish the rights-of-way. In all cases the



resulting landscape will immediately look cleaner and less cluttered. In some locations, the use of stump grinders might open the ROW to landscaping activities almost immediately. In other cases, the final results will be established over the course of a few years. The benefits of IVM will be felt most clearly in areas where if the town simply went through and mechanically cleared the ROWs, the long term result would be mono-cultures of resprouts and invasive plant species (See Illustration 5).



Illustration 5: Mono-culture of tree re-sprouts: result of repeated mechanical treatments

In conclusion, IVM increases the time frame between treatment cycles thereby reducing the impact of the treatment methods on the environment; the health and safety exposures of contract and DPW personnel, the public, and the budgetary costs of more intensive treatment programs.⁶ The results are ROWs that: provides a cleaner landscape that includes habitat for small mammals and birds; browse for herbivorous mammals; and prevents soil erosion and sedimentation of water and wetland resources.⁷

⁶USDA, Forest Service, "Pesticide Background Statements, Volume 1. Herbicides," Agriculture Handbook Number 633, 1984; USEPA, Environmental Stewardship Strategy for Electric Utility Rights-of-Way, Pesticide Environmental Stewardship Program, Edison Electric Institute Vegetation Management Task Force, August 1996; U.S. Environmental Protection Agency. "Fact Sheet: Benefits of Integrated Vegetation Management on Rights-of-Way (EPA 731-F-08-011)," October 2008; Richard A. Johnstone, Richard A. "Integrated Vegetation Management," www.UtilityArborist.org, Utility Arborists Association, Summer 2008.

⁷Wendy L. Priestley, National Grid Five Year Massachusetts Vegetation Management Plan 2009-2013.

Section 3.0: Implementing IVM

Achieving the goals of an IVM program is not just a matter of using mechanical and chemical controls applied to the ROW in an unvarying approach. A comprehensive vegetation management program takes into account geologic, geographic, climactic, environmental and legal factors in determining the best approach to controlling vegetation. For example, although average vegetation growth rates are known for various species, soil types, moisture levels, elevation and land use patterns determine actual species composition, density and growth rates.⁸ Taking the aforementioned factors into consideration, selecting the best control method depends on timing applications for maximum effect, avoiding fixed application schedules, monitoring the ROWs and allowing for the removal of potential hazard and danger trees or vegetation.⁹

To establish early successional ecological communities, and thus an IVM program on these ROWs, the DPW will first have to remove the forty-plus years of tree growth, woody shrubs and invasive plant species currently obscuring the ROWs, the location of the pipelines and manhole covers. As a result, the first phase of this IVM program will include the removal of trees, shrubs and noxious vegetation including invasive plant species. Once established, these low growing landscapes will be managed using selective chemical and mechanical treatment methods, or potentially by the landowners.

Thereafter, where appropriate, the use of a selective IVM program will, over time, significantly reduced both the per-acre application rate of herbicides and the need for intensive mechanical controls. Some areas will be treated by selective mechanical and herbicide maintenance operations generally scheduled on a 3-5 year “treatment cycle.”¹⁰ Invasive species will be scheduled for treatment as needed. Other areas will scheduled for annual field mowing and/or landowner landscape activities will be the method of choice (except in the cases of emergencies or the need to access the pipeline). In all cases, the use of IVM reduces management activities due to controlling the roots of incompatible target vegetation and the benefits of establishing herbaceous plants and grasses—both as landscape areas and more natural areas where possible—that resist the invasion of incompatible target vegetation.¹¹

⁸Stephen H. Spur and Burton V. Barnes. *Forest Ecology*, Krieger Publishing Co., Malabar, FL, 1996.

⁹Wendy Priestley. TransCanada New England Vegetation Management Plan; National Grid Five Year Massachusetts Vegetation Management Plan 2009-2013; NSTAR Electric Five Year Massachusetts Vegetation Management Plan, 2008-2012.

¹⁰ The treatment cycle will be established at the completion of the four treatment phases described.

¹¹C.A. Nowak and L.P. Abrahamson, “Vegetation Management on Electric Transmission Line Rights-of-Way in

3.1: IVM SURVEY BY ISA CERTIFIED ARBORISTS

Recognizing the need to re-establish clearly defined ROWs, the DPW initiated the process by employing the services of ISA (International Society of Arboriculture) certified arborists to conduct a vegetation survey of the seventy-three sanitary sewer ROWs currently deemed appropriate for instituting a long-term IVM program. Upon the completion of notifying landowners with easements on their property, this survey was conducted between December 2014 and February 2015.

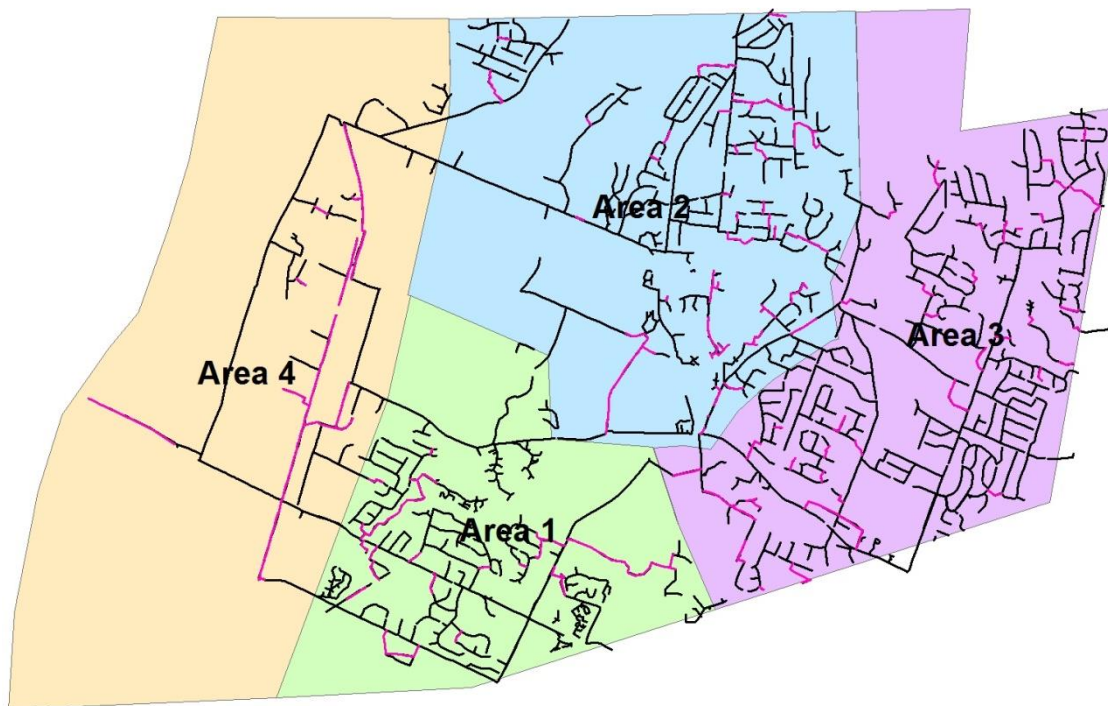


Illustration 6: IVM Treatment Areas

As a result of this survey, the DPW has divided the town into four treatment areas in which the DPW is implementing a four phase treatment program. The resulting maps are included in Appendices 1-5. These particular maps are overviews of the treatment areas. Additional detail maps will be included in all specifications handed to vegetation management contractors. The DPW holds the results of the survey in the town's GIS system. Illustration 6 is a broad view of the four treatment areas, the pipelines (black lines) and the current treatment areas (purple lines).

New York State: The Stability Approach to Reducing Herbicide Use," Proceedings of the International Conference on Forest Vegetation Management, Auburn University, April 1993.

3.2: TREATMENT PHASES

Before delving into the specifics of the DPW's treatment phases, please note that these phases are not tied to any particular calendar year. They are instead the order in which the DPW will be implementing the treatment methods/steps necessary to establish fully operational IVM programs in each treatment area. Also, descriptions of each treatment method are included in Section 5 and the best management plans (BMPs) for both contract and DPW personnel are included in Section 7. These BMP's are a set of guidelines for vegetation management activities and the required qualifications for contractors. The phases will inform the treatment specifications for individual years. Once completed, this VMP will be updated based on field surveys and monitoring to reflect the changing ecological communities established on the ROWs in this foundational program. It does not preclude emergency maintenance and repair activities. Note: The naming convention for the individual easements on the maps in Appendices 2-4 utilize the start and ending manhole cover numbers from West to East, or South to North.

Phase 1: Removals/Field Mowing/Brush Mowing: Phase 1 is a combination of tree removals and clearing the ROWs indicated on the maps of trees, shrubs and invasive plant species. Also, where marked this will be the first time the town implements annual field mowing to maintain existing early successional ecological communities. Please Note: field mowing is part of all phases.

Phase 2: Initial IVM treatment: In addition to continuing field mowing. This phase includes the use of selective mechanical methods and herbicide applications. Depending upon the growth of invasive plant species and tree/shrub resprouts from Phase 1 it may also include brush mowing to selected areas.

Phase 3: Second IVM treatment: Again, still field mowing, but there will be additional areas converted to this treatment method. IVM treatments as listed under Phase 2 will be selective and be a matter of taking care of resistant/aggressive plant types such as invasive plant species.

Phase 4: IVM established: The use of both mechanical methods and herbicide application rates will be reduced due to the reduction of incompatible plant species and

their root systems. Methods will become more selective. There may be additional field mowing areas.

3.3: CONCLUSION

The Phase system is both a plan and a set of guidelines. The program also takes into consideration all factors involved in the maintenance and operation of the pipelines including the possibility of accommodating unique situations and the need for more appropriate techniques as they arise in the future; ecological succession is not stable, regulations change, and new research leads to both a better understanding of ecological issues and the development of new maintenance methods. With all of this in mind, even in these early stages, this IVM program maintains the overall flexibility necessary to accommodate changes.

SECTION 4.0: INCOMPATIBLE VEGETATION

Pursuant to the policy and intent set forth in this VMP, all vegetation must be removed that obscures the ROWs and grows tall or thick enough to interfere with the safe operation of the pipeline; this is known as incompatible or target vegetation. As a rule, the targets, therefore, are woody vegetation species; tree, shrub and vine species. The other primary target is noxious vegetation including poisonous and invasive plant species.

At the end of Phase IV, the ideal early successional ecological communities on the ROW are, therefore, native grasses and herbaceous plants. The goal is more non-target vegetation species on the ROWs than incompatible targets. Please note, however, that low growing vegetation may itself, in some cases, be a target when it obscures or otherwise limits access to the ROW, pipeline and manhole covers.

4.2 HAZARD TREES

Trees that are in such a structural condition whereby they may be in danger of falling on the easement or from the easement and cause a dangerous situation or damage. For examples, trees damaged by lightning, pests or disease. Also vegetation with root systems that have the potential to penetrate or otherwise cause an emergency situation with the pipes; for example, willow trees or tree roots growing over access points (e.g. manhole covers).

4.3 LIMBS AND BRANCHES

Not all limbs and branches are incompatible to the operation of the pipeline. These structural components of woody vegetation are targets when they obscure the ROW easement corridor or are a hazard due to damage, disease or age related weakness.

4.4 VINES AND BRAMBLES

Vines and brambles can obscure the ROW easement corridor and can make it difficult to impossible to access the pipeline. For example, two of the primary plant species that fit into this category are Oriental Bittersweet and Multiflora Rose; both are considered invasive plant species by the State of Connecticut, and both are discussed under Section 4.5 *Invasive Plant Species*. Impenetrable thickets of blackberries, raspberries and black raspberries are also targets where they obscure access to the manhole covers.

4.5: NOXIOUS VEGETATION

Noxious Weeds are defined by the federal *Plant Protection Act* as: "...any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment."¹² This includes both poisonous and invasive plant species.

4.5.1: Poisonous Plant Species are plants that may cause allergic reactions when touched or ingested. These include, but are not limited to: Poison Ivy and Poison Sumac. These plant species are a hazard to landowners, DPW personnel and contractors.

4.5.2: Invasive Plant Species: According to Presidential Executive Order 13112 (February 1999):

An invasive species is defined as a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health."¹³

The *Connecticut Invasive Plant Working Group* (CPWIG, a part of the *Connecticut Invasive Plant Council*) is equally concerned about the effect on natural or minimally managed areas.¹⁴ In the *Invasive Plant Council's* 2014 annual chairman's letter, the chairman, called for programs around the state to "prevent future invasions" and that "direct resources to targeted eradication programs."¹⁵ On the DPW's ROWs, eradicating invasive plants serves many purposes, not the least of which is the ability to identify the location of the pipeline and the ability to access the pipe in the case of an emergency. In other words, while the DPW is committing itself to participate in the movement to eradicate invasives, it also needs to do so in order to fulfill the purpose of this VMP.

Invasive plant species pose a significant threat to the natural diversity of native plants, invertebrates and vertebrates. Invasive plants are characterized by their ability to spread extremely rapidly, especially in disturbed areas, along watercourses and ROW corridors. Typically, invasive plants possess one or more of the following characteristics: aggressive

¹²United States Public Law 106-224—June 20, 2000, Title IV—Plant Protection Act.

¹³ http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ct/technical/ecoscience/invasive/?cid=nrcs142p2_011124:

¹⁴ *Ibid.*

¹⁵ *Invasive Plants Council Twelfth Annual Report December 16, 2014*, Letter by Chairman Richard McAvoy.

growth and maturity; spread quickly by seed and/or rhizomes; have few or no natural pests or diseases; tolerate or thrives in many environments, and can be difficult to remove or control.

Many of these non-native, "exotic" invasive plant species were planted for their showy flowers, vigorous growth, fruiting abundance and erosion control. Due to their aforementioned behaviors, however, they have spread well beyond their planted areas overwhelming native species and reducing diversity.

Invasive plant species commonly found in South Windsor in the IVM survey, include, but are not limited to:

1. Oriental Bittersweet
2. Multiflora Rose
3. Norway Maple
4. Buckthorn
5. Honeysuckle
6. Autumn Olive

4.5.3 Resources include the list below and examples of fact sheet for the species in Appendix 5.

1. Connecticut Invasive Plant Working Group:
<http://cipwg.uconn.edu/>
2. Connecticut's Current Invasive Plant List:
<http://cipwg.uconn.edu/2014/12/30/invasive-plant-list/>
3. USDA, Natural Resources Conservation Service, Introduced, Invasive, and Noxious Plants webpage:
<https://plants.usda.gov/java/noxiousDriver>
4. USDA, National Agricultural Library, National Invasive Species Information Center (NISIC) webpage:
<http://www.invasivespeciesinfo.gov/index.shtml>

4.6: PLANTED VEGETATION AND VEGETATION RULES IN THE SEWER LINE EASEMENTS

Per the current *Sewer Line Easement Permanent and Temporary Construction Easements* language:

...the Grantee [DPW], its successors assigns, shall have the right to cut trees and bushes

as may be convenient or necessary and to remove structures thereon, and to pass and repass with men and equipment, to operate equipment and install materials incidental to the construction, maintenance or repair of sewer line, and to excavate and fill.

In other words, the DPW may manage vegetation on the ROWs to protect the pipeline and to manage vegetation growing within the easement corridor. This includes planted vegetation that interferes with the operation of and access to the pipelines. Low growing vegetation other than “trees and bushes” that does not interfere with the pipeline will only be affected when/if at any point a pipeline needs to be excavated.

SECTION 5.0: INTENDED VEGETATION TREATMENT METHODS

The following is a descriptive listing of the DPW's intended vegetation management methods detailing the individual techniques available. The application of the individual treatment methods is based on the results of the IVM survey conducted in 2014-2015, site sensitivity, regulatory mandates, target species composition, density and height, site access and topography. This is only a guideline for DPW personnel and contractors. Therefore, as long as the contractors are complying with the treatment specifications, all applicable federal, state and municipal laws and regulations, and this VMP, the DPW may approve variation in the exact equipment utilized.

The following procedures will be implemented during all vegetation maintenance activities:

1. In advance of non-emergency treatment activities, the DPW will notify easement holders.
2. During this notification process, the DPW will also discuss the need to remedy situations where vegetation has been unintentionally planted in the easement and it obscures the ROW and/or interferes with the pipeline and access.
3. All contractors will comply with appropriate regulations, and licensing requirements
4. All contractors will comply with applicable ANSI standards including, but not limited to Z-133 (*Arboricultural Safety Standards*), A-300 parts 1-9 (tree care practices), and ANSI/OPEI B71.4-2004 Commercial Turf Care Equipment - Safety Specifications.
5. ROW access will be through the use of established roadways or access points whenever possible.
6. Where applicable, permission to enter a ROW by any other means must be obtained from the landowner.
7. Unreasonable site damage or destruction during any phase of the vegetation management operation by the contractor, his agents or employees, must be repaired.

5.1 MECHANICAL CONTROLS

Mechanical controls are the physical removal of the stem and branches of vegetation by cutting, chopping or mowing, usually leaving the root system intact. These include removals, hand cutting, brush mowing, field mowing, lawn mowing, side trimming, chipping and stump grinding. Treatment activities will include the selective removal of target species within the ROW, branches that overhang the ROW and danger or hazard trees outside of the ROW.

As a key component of this IVM program, mechanical methods are used:

1. To control areas of thick, tall and sometimes impenetrable vegetation that restricts access to the ROW, often followed up with herbicide applications to the resulting resprouts (removals, brush mowing).
2. To remove hazard and danger trees
3. For side trimming
4. In preparation for selective foliar applications
5. In conjunction with cut surface treatments (CST)
6. To support field or lawn mowing to maintain early successional ecological communities
7. In certain sensitive areas (See Section 6).

The following guidelines are observed in all mechanical operations:

1. Mechanical controls are used in chemical restricted areas.
2. Mechanical controls are used in preparations for chemical controls.
3. Areas too saturated to support mowing equipment are hand-cut.
4. Equipment access through wetlands or over waterbodies will be avoided as much as practicable by utilizing existing public or private access roads and permanent stream crossings whenever possible.
5. Equipment mats (or equivalent for equipment support) will be used everywhere appropriate including, but not limited to areas where saturated soils are present and on lawns if necessary.
6. Mowing/removals contractors are expected to repair any rutting or significant damage to wetland or waterbody banks and vegetation immediately following completion of maintenance activities.
7. Any areas of significant soil disturbance will be stabilized and allowed to re-vegetate immediately following completion of maintenance activities.
8. All mechanical equipment is expected to be in sound operating condition.
9. Treatment crews will have petroleum spill kits available.

5.2 MECHANICAL METHODS

5.2.1 Hand Cutting is the use of hand-held saws to remove the stem and/or branches from the plant's root system. Hand cutting is used to remove hazard trees; target vegetation generally greater than twelve feet tall; to protect sensitive areas, and where herbicide use is prohibited. Hand cutting is also used on sites where terrain, target species size or sensitivity renders mowing impossible or impractical. Hand cutting may be used at any time of the

year. Removals include hand cutting.

The following guidelines are observed during cutting operations:

1. Target vegetation is cut as close to the ground as practical with stump height usually no higher than root swell.
2. Slash will not be left in areas where it might affect the property of easement holders, instead woody materials will be chipped and/or hauled to an appropriate off-site location (following state invasive species statutes and regulations, see Appendix 5).
3. Where appropriate, under the direction of the DPW, cut stems may be slashed and/or diced:
 - a. In areas of medium to heavy density target plants, slash is left in parallel rows on the edge of the ROW in windrows no greater than eighteen inches in height and the windrow must be less than twenty percent of the width of the ROW.
 - b. A fire break is maintained for every fifty feet of windrow—with twenty-five feet between piles/windrows.
 - c. In areas of very light to light density target plants with under six inch Diameter at Breast Height (DBH), slash is diced where it falls so that it lies as close to the ground as practical; the diced slash should not exceed eighteen inches in height.
 - d. Slash with a more than three inch diameter may not be piled one piece over another.
 - e. Large trees will be removed.
 - f. In areas adjacent to roads, slash over three inches in diameter must be removed or chipped.
 - g. Slash will not be left in or on waterways, fence lines, stone walls, trails or roads, or in a manner that would permit it to wash into these areas.
 - h. Slash from yards or recreational sites will be chipped or removed to adjacent areas for disposal.
4. Chipping is used at sites when dicing or piling are prohibited, impractical or very close to residences:
 - a. Wood chips will be removed, or
 - b. Scattered uniformly over the site at depths not exceeding four inches.

5.2.2 Brush Mowing is the cutting, severing or shattering of vegetation by large rotary or flail mowers. Heavy-duty mowers, usually ranging from five to eight feet wide, are typically mounted on four-wheel drive rubber tired tractors or tracked vehicles. Brush mowing is used where target stem densities are high and stems are tall, but not in areas where stem diameters and heights exceed the ability of the mowing equipment. In other words, brush mowing is used in areas in which stem size is up to three inches in diameter in medium to dense stands

of targets. It is only appropriate where terrain, site size and sensitivity permit the efficient use of the equipment. Mowing may be used at any time of the year except when deep snow precludes operations.

The following guidelines are observed during brush mowing operations:

1. Mowing height is no higher than six inches unless required by regulation.
2. Operators must perform daily integrity inspections of hydraulic systems and carry petroleum spill control equipment on the mowing machines.
3. Operators must use designated access to ROW.
4. Mobile equipment shall not pass over residential lawn areas before landowner notification.
5. Hand cutting will be used in areas where mowing is restricted by terrain conditions such as steep, rocky sites, wet soils, or next to obstructions such as stone walls and fence lines.
6. Extreme care must be exercised to insure the safety of the general public as brush mowers can throw large chips and debris great distances from the cutting equipment. When appropriate personnel will be employed to prevent people and animals from coming too close to the work site.

5.2.3 Side Trimming is the trimming or removal of encroaching tops and/or branches of trees growing on or near the ROW which may cause a hazard, hamper access and/or impede visual inspections. Side trimming is accomplished by the use of an aerial lift mounted on a street or off-road vehicle, and/or tree climbing. This method helps maintain the edge definition of the easement where it is surrounded by trees allowing for easier access to the ROW for inspections, maintenance activities and emergencies. All trimming activities are performed in accordance with proper arboriculture practices and in compliance with all applicable regulations to insure the health and aesthetic value of the trees.¹⁶ This method may be used any time of year except when deep snow precludes operations. This method will be used to keep the sides clear up to at least 30 feet above the ground.

5.2.4 Removals are the removal of trees with stem diameters above three inches. Removals include anything from the removal of a single tree to land clearing/logging type operations where the ROW is obscured by tree growth (with shrubs and invasive plant species mixed in). The equipment used in removals includes chain saws, truck or skid-steer mounted aerial

¹⁶American National Standards Institute. ANSI Standard for Arboricultural Operations—Safety Requirements (ANSI Z133.1-2006); American National Standards Institute. ANSI A300 Part 1 (Pruning)-2001.

lifts, tree shears, grapples, chippers, stump grinders, etc... Upon the completion of the four phases listed in Section 3, the primary use of removals will be the removal of individual trees, which may be done in conjunction with side-trimming to remove hazard trees. This method may be used any time of year except when deep snow precludes operations.

5.2.5 Chipping is the process of turning woody vegetation into small 1-2" by ½" pieces using wood chippers. This method is used in conjunction with all mechanical operations except mowing which itself converts vegetation into small pieces (it is used in areas where hand cutting is used in brush mowing operations). Chips are either spread over the easement where appropriate or removed from the site. Only in agreement with the landowner will chips be left or scattered outside the boundaries of the easement. This method may be used any time of year except when deep snow precludes operations.

5.2.6 Stump Grinding is the process of grinding the stumps with a piece of landscaping equipment appropriately called a "Stump Grinder." Stump grinding is used on large woody vegetation in areas where it might cause a hazard or for aesthetic reasons. The stumps are usually ground to six inches below grade and the area may be loamed and seeded. It is used in conjunction with removals and hand cutting and may be used any time of year except when deep snow precludes operations. Always call *Call Before You Dig* (CBYD) before all stump grinding operations.

5.2.7 Field Mowing is mowing with large/professional grass mowing equipment to control the establishment of woody stemmed vegetation. On sections of the ROWs designated as field mowing areas, this will be an annual treatment operation.

5.2.8 Lawn Mowing will take place on parts of the ROW where lawns are established using homeowner or professional lawn mowers. It will also occur where the ROWs runs along roadside easements as an extension of the DPW's existing seasonal mowing program.

5.3 CHEMICAL (HERBICIDE) CONTROLS

Chemical controls are the application of herbicides to the foliage, stems and/or root zone of vegetation to suppress growth and achieve root control. These include foliar, basal and cut stump surface treatments.

5.3.1 Herbicide Applications contribute to this IVM program because:

1. They reduce site disturbance, particularly selective herbicide applications.
2. The entire target plant, *including the roots*, is controlled, stopping their spread by resprouts, adventitious root suckering and/or rhizomes.
3. They increase the length of time between treatment cycles by reducing the recurrence and stem counts of target vegetation.
4. They minimize the amount of manpower and equipment and their repeated impact on the environment.

As a rule the DPW will choose herbicide formulations that, when used appropriately, are low in acute toxicity, are not known to bio-accumulate and, as applied, have a short half-life with low soil mobility.¹⁷ These formulations are applied using the most selective methods possible for the conditions on the individual ROWs. Anti-drift adjuvants are required to accommodate changes in wind velocity. Applications are also not made in situations when there is a reasonable expectation that herbicides might drift from the target, or during measurable precipitation. The DPW does, however, reserve the right to use other appropriately labelled herbicides on a case by case basis if necessary.

5.3.2 The following guidelines are observed in all herbicide applications:

1. Herbicide applications follow all federal and state regulations and required permits.
2. The DPW will only approve herbicides registered with and approved by the U.S. Environmental Protection Agency (EPA) with low toxicity to non-target plants and animals.
3. Application of herbicides will be in accordance with the Federal Insecticide, Fungicide and Rodenticide Act.
4. Application of herbicides will be in accordance with all applicable regulations promulgated by the State of Connecticut including the Pesticide Control Act (Title 22a, Chapter 441, see Appendix 4).

¹⁷USDA, 1984; USEPA. *Environmental Stewardship Strategy for Electric Utility Rights-of-Way*, Pesticide Environmental Stewardship Program, Edison Electric Institute Vegetation Management Task Force, August 1996; K.H. Deubert. *Studies on the Fate of Garlon 3A and Tordon 101 Used in Selective Foliar Application in the Maintenance of Utility Rights-of-Way in Eastern Massachusetts*, Final Report prepared for New England Electric et al., 1985; Harrison Biotech, Inc. *A Generic Environmental Impact Report on the Control of Vegetation on Utility and Railroad Rights-of-Way in the Commonwealth of Massachusetts*, Final Report prepared for the Department of Food and Agriculture, Commonwealth of Massachusetts, 1985; N.H. Nickerson, G.E. Moore and A.D. Cutter, *Study of the Environmental Fates of Herbicides in Wetland Soils on Electric Utility Rights-of-Way in Massachusetts over the Short Term*, Final Report prepared for New England Electric et.al., December 1994; Massachusetts Department of Agricultural Resources. *Surface Water Monitoring of Glyphosate used in Rights-of-Way Railroad Vegetation Management (2005–2006)*, Report, November, 2006.

5. Following the Connecticut *Use of Pesticides* Section 22a-66.1-7 regulations, herbicides will be used in strict accordance with the manufacturer's EPA approved label (see Appendix 4).
6. At least one individual from any company applying herbicides must hold a Supervisory Certificate issued by the Connecticut Department of Energy and Environmental Protection (DEEP).
7. All herbicide applications will be performed by qualified, experienced, trained vegetation management maintenance crews (see Section 7).
8. Mixing will take place according to all labeled restrictions.
9. Mixing will only be performed at a DPW or the contractor's facility.
10. The contractor is responsible for the proper disposal of all excess materials and solutions in accordance with all applicable federal and state laws, regulations and guidelines.
11. Appropriately labeled herbicides are not applied to active pasture land unless permission is granted from the owner of the livestock.

5.4 HERBICIDE METHODS

All Herbicide methods will be applied as selectively as possible. The end goal is to institute staggered 3-5 year treatment cycle of selective treatments in Areas 1-4 for general herbicide applications. There may also be annual treatments to spot areas, particularly for the treatment of invasive and poisonous plant species (noxious vegetation).

5.4.1 Foliar: The application of herbicides to fully developed leaves, stems, needles or blades of a plant.

1. The herbicide concentrate is usually mixed or diluted with water and applied as a uniform spray over the plant's foliage.
2. Equipment includes:
 - a. Back pack sprayers
 - b. Vehicle mounted sprayers.
3. Treatments use low pressure, below 60 pounds per square inch (psi) at the nozzle, for applications.
4. This technique is generally the most economical and effective method used:
 - a. In medium and high brush densities
 - b. To control invasive and poisonous vegetation.
5. The application period usually extends from early June through the beginning of leaf abscission in the Fall, when not restricted by regulations.

5.4.1.1 Low Volume Backpack Foliar Applications utilize hand-operated pumps or motorized, backpack sprayers.

1. Hand-operated pumps deliver an herbicide(s) mix in a stream of water from a three to five gallon spray tank.
2. Motorized, backpack sprayers produce an air current that delivers the herbicide(s) mix in small droplets from a portable three to five gallon spray tank.
3. Both techniques require the applicator to *only dampen or lightly wet* the target leaf area; not to the point of runoff. This minimizes herbicide drip from target species onto ground cover.

5.4.1.2 Vehicle Mounted Applications generally utilize a hydraulic sprayer mounted on a truck, tractor, off road or tracked vehicle equipped with hand-held spray guns.

1. The herbicide mixture is directed at targeted vegetation or broadcast for uniform coverage.
2. Specially designed nozzles can reduce spray volumes and limit droplet fines thus reducing the potential for spray drift off-target.
3. Nozzles can deliver effective spray coverage at relatively low spray pressures of sixty psi and less.
4. This technique is capable of delivering uniform, penetrating spray coverage to dense, tall, target vegetation.

5.4.1.3 The following guidelines are observed in all foliar applications:

1. Anti-drift agents are added to the mix or solution to reduce the potential of herbicide drift beyond target vegetation. Drift control agents reduce the break-up of sprays into fine droplets and offer increased selectivity, leaf tissue penetration, and herbicide deposition on target plants.
2. Foliar applications are not made:
 - a. To target vegetation too tall to effectively treat/cover the canopy
 - b. To target vegetation standing in surface water (except in a specialty application with the appropriate permits, licenses, herbicides, etc. as described in section 6.2)
 - c. To target vegetation that would jeopardize the selectivity or sensitivity of the site
 - d. Within mechanical-only *sensitive areas*
 - e. During periods of wind, which are strong enough to bend the tops of the main stems of mature tree species on the ROW
 - f. During periods of moderate or heavy rain fall (where leaf runoff can wash the herbicide off the target plants)
 - g. Before moderate to heavy rain fall, follow the product label(s).

3. Foliar treatments are an effective tool in the conversion of these ROWs to an IVM program, along with the appropriate “preparatory” mechanical operations.
4. Selective foliar treatments will be the herbicide application method used in wetland areas following all labeled restrictions and the restrictions listed in Section 6.2.

5.4.2 Cut Stump Surface Treatments (CST): The application of an herbicide mix in water or a non-freezing agent directly to the cut surface of a stump immediately following or during a cutting operation to prevent resprouts and root suckering.

1. Application equipment includes:
 - a. low-volume, backpack, hand-pump sprayers
 - b. hand held squirt bottles
 - c. paintbrushes
 - d. sponge applicators.
2. It is only necessary to treat the phloem and cambium tissue, regardless of the stump diameter.
3. Ideally treatment should be to freshly cut stumps.

5.4.2.1 The following guidelines are observed in all CST applications:

1. CST is used:
 - a. To prevent resprouts of vegetation cut in preparation for a foliar application
 - b. To reduce the visual impact of vegetation management treatments
 - c. For its selectivity to protect desirable vegetation
 - d. To treat target vegetation with herbicides in areas where other methods are not appropriate due to the time of year of site sensitivity
 - e. At any time of the year.
2. CST is best avoided:
 - a. During the season of high sap flow
 - b. In moderate to heavy stem densities.
3. CST is not used:
 - a. In moderate to heavy rains
 - b. In deep snow that prevents hand cutting
 - c. In chemical restricted areas.

5.4.3 Low Volume Basal Treatment: a selective hand-pump backpack sprayer application of an herbicide diluted in specially formulated oil, to wet the entire lower 12-18” of the main stem of target vegetation; the oil enables the herbicide solution to penetrate the bark tissue and translocate within the plant.

5.4.3.1 The following guidelines are observed in all Low Volume Basal applications:

1. Low volume basal treatments are extremely selective and used:
 - a. When vegetation density is low
 - b. In areas where extreme selectivity is necessary
 - c. Any time of year, including in the dormant season when foliage, grasses and herbaceous plant are not obstructing the main stem.
2. Low volume basal treatments are not used:
 - a. During periods of rain or when stems are wet
 - b. In deep snow that prevents treating the lower 12-18” of the main stem
 - c. In chemical restricted areas.

SECTION 6.0: BEST MANAGEMENT PRACTICES FOR SENSITIVE AREAS

The DPW expects all contractors to treat the entire width and length of the designated ROWs under consideration in this VMP as if they are sensitive areas. There are, however, some cultural and environmental areas on the ROWs that deserve extra attention. The treatment of these areas takes careful thought, planning and execution on the part of the DPW and its contract personnel. The flexibility of an IVM program is suited to managing these *sensitive areas*; this is one of the primary benefits of instituting an IVM program.

The important item to understand when discussing *sensitive areas* is that they are defined according to two different categories based on what can be done within their boundaries and how to identify their boundaries.

Regarding the first category, there are *Mechanical Only Areas*, *Limited Spray Areas* and *Specific Sensitive Area Recommendations*. The definition of *Mechanical Only Areas* is self-evident. The definition of *Limited Spray Areas* is areas in which either the treatment method and/or the herbicides follow particular prescriptions. In other words, the DPW will maintain a list of “recommended herbicides” for use in limited spray areas. The properties of which will be herbicide formulations that are low in acute toxicity, are not known to bio-accumulate and, as applied, have a short half-life with low soil mobility.¹⁸ These formulations will be applied using the most selective methods possible for the conditions on the individual ROWs. *Specific Sensitive Area Recommendations* are within individual sites that require their own set of rules such as wildlife habitat areas as described in Section 8, or areas in which the DPW has written Alternative Treatment Agreements.

The second category involves identifying *sensitive areas*. In this case there are two types of *sensitive areas*:

1. *Readily Identifiable in the Field*
2. *Require the Use of Identification Tools*

Readily Identifiable in the Field areas can be found in the field by trained, experienced contractors and/or DPW staff. These include areas such as standing or flowing water, gardens, agricultural areas, etc. These areas will be marked/flagged *as necessary* in advance of any

¹⁸*Ibid.*

treatment crew using appropriate measuring tools (measuring tapes, range finders, trained pacing, etc.).

Areas that *Require the Use of Identification Tools* are simply put: not readily identifiable in the field. These areas will be marked/flagging in advance of any treatment crew using appropriate measuring tools. These areas include, but are not limited to public wells, private wells, organic farms and Endangered, Threatened or Species of Special Concern under the protection of the Connecticut Department of Energy and Environmental Protection. To find these areas requires the use of (including, but not limited to) maps, GIS tools, DPW institutional knowledge, information gathered in the notification process, and/or information from other municipal, state and federal entities.

Since *sensitive area* data may change over the years, specific locations are not included in this VMP. Instead, the most current edition of this data will be considered companion documentation/data sources to this VMP that must be made available to the treatment crews at the time of treatment to enable maintenance contractors and DPW personnel to locate protected resources in the field and cross reference specific management activities.

6.1 MECHANICAL ONLY AREAS

Mechanical only areas include buffers on surface waterbodies and water supplies and identified natural areas with special recommendations from authorized entities.

The restrictions on where to use herbicide under the Connecticut *Use of Pesticides* Section 22a-66.1-7 regulation is to follow the EPA herbicide label. At a minimum, the DPW, therefore, requires that all herbicide applications follow the requirements for the herbicide with the strictest label in the herbicide mix being applied. In additions to this, the DPW is voluntarily added the following “no-spray” restrictions to all herbicide applications:

1. No herbicides will be applied within fifty (50) feet of any *identified* private well within one hundred (100) feet of the ROWs.
2. There are currently only two public wells in South Windsor which will be buffered according to herbicide label restrictions.
3. No herbicides will be applied during general herbicide applications within ten (10) feet of standing or flowing water. Special herbicide applications within the ten feet are included in Section 6.2 including restrictions on treatments within these areas.

4. No herbicides will be applied during general herbicide applications within ten (10) feet of standing or flowing water in wetlands. Special herbicide applications within the ten feet are included in Section 6.2 including restrictions on treatments within these areas.¹⁹
5. No herbicides will be applied within twenty-five (25) feet of gardens/agricultural crops.
6. No herbicides will be applied in active pastures without the permission of the livestock owner and/or landowner. If permission is granted, follow the restrictions in Section 6.2.
7. No herbicides will be applied to herbicide restricted habitats of Endangered, Threatened, or Species of Special Concern *as restricted by, in cooperation with, at the request of, and only under the direction of* the DEEP.
8. The town may enter into signed *Alternative Use Agreements* with *certified* organic farms.

Mechanical only maintenance activities are not a long term solution to achieving compliance and have their own environmental impacts.²⁰ Mechanical only methods result in areas of adventitious dense monocultures of woody vegetation. They, therefore, will need to be monitored annually due to the rapid growth of resprouts and adventitious roots.

6.2 LIMITED SPRAY AREAS

Limited Spray areas require the use of herbicides on the DPW's recommended herbicide list, as discussed in Section 6.0. These are voluntary definitions on the part of the DPW. They include:

1. For general herbicide application, within wetlands except within 10 feet of standing or flowing water.

¹⁹Environmental Consultants, Inc., Study of the Impact of Vegetation Management Techniques on Wetlands for Utility Rights-of-Way in the Commonwealth of Massachusetts, Final report prepared for New England Electric et.al., 1989. Nickerson et al., 1993; Deubert, K. H. and I. Corte-Real. "Soil Residues of Picloram and Triclopyr after Selective Foliar Application on Utility Rights-of-Way." Journal of Arboriculture 12, 1986: pp. 269–272.

¹⁹Lewis M. Cowardin, Virginia Carter, Francis C. Golet and Edward T. LaRoe. Classification of Wetlands and Deepwater Habitats of the United States, U.S. Department of the Interior Fish and Wildlife Service Office of Biological Services, Washington, DC, 1985. Selective herbicide applications have been used throughout Connecticut for decades and have been shown in various studies throughout the Northeast to not adversely affect either the plant composition or function of wetlands. In fact, according to one of the studies by Environmental Consultants, Inc. there was no significant impact to the wetlands from any of the maintenance techniques including selective mechanical methods but while no herbicide residues were discovered, residues were found from petroleum products. Other studies in New England show that selective low-volume foliar applications of herbicides with low mobility and persistence based on environmental fate studies that consider half-life, the soil sorption coefficient, water solubility and vapor pressure are the preferred methods in wetlands.

²⁰Environmental Consultants, Inc., Study of the Impact of Vegetation Management Techniques on Wetlands for Utility Rights-of-Way in the Commonwealth of Massachusetts, Final report prepared for New England Electric et.al., 1989. Environmental Consultants, Inc (ECI) found that while herbicide residues were not found, petroleum product residues were found in the leaf litter at mechanical sites.

2. For special herbicide applications, within 10 feet of standing or flowing water buffer, using herbicides on the DPW's list that are additionally labelled for use in water.
3. Within pastures with permission of the farmer and using herbicides from the DPW's list that are additionally labelled for use in pastures.
4. Herbicides will only be applied to Endangered, Threatened, or Species of Special Concern and/or their habitat *in cooperation with, at the request of, and only under the direction* of the DEEP.

6.3 SPECIFIC SENSITIVE AREA RECOMMENDATIONS

These are individual, identified areas with site specific recommendations. Their location and treatment recommendations/restrictions will be maintained by the DPW. They include, but may not be limited to the following:

1. Herbicides will only be applied to Endangered, Threatened, or Species of Special Concern or their habitat *as restricted by, in cooperation with, at the request of, and only under the direction* of the DEEP.

6.4 GENERAL SENSITIVE AREA RECOMMENDATIONS

1. Follow Industry best management practices per ANSI Z133 and A-300, parts 1-9 and DPW specifications for mechanical treatments in wetlands and watercourses: no fueling in wetlands or watercourses, matting etc.
2. Do not spraying cherry in active pastures.
3. Do not leave cut cherry in active pastures.
4. Where appropriate, follow Vernal Pools Best Management Practices included in Appendix 3.
5. All arboricultural work is to be conducted in accordance with all current Emerald Ash Borer and Asian Long Horned Beetle restrictions. It is up to the contractor to be current on all laws.
6. As a courtesy, knock on landowner's doors to notify them of what you are doing on their property at the time of treatment.

Please Note: Other culturally or environmentally "special recommendation" *sensitive areas* might be added to the maintenance program as they arise.

7.0: VEGETATION MAINTENANCE BEST MANAGEMENT PRACTICES

In essence, this entire VMP is the Best Management Practices (BMP) for vegetation maintenance activities on the DPWs ROWs; this being said, it is necessary to include some more detailed BMP's for both DPW and contract personnel. Section 7, therefore, includes contractor qualifications; operational guidelines; directions on required paperwork; an outline of the notification process, and a listing of paperwork/information contractor(s) need to complete the work to the appropriate standards. This section does not include BMP items found throughout this VMP, particularly in Sections 5 & 6, but it shall be understood that they are part of the Vegetation Maintenance BMPs. The DPW further expects all contractors to follow appropriate industry standard BMPs for their particular field of expertise and equipment specifications (land clearing, side trimming, brush mowing, herbicide applications, etc.).

7.1 QUALIFICATIONS

The contractor must demonstrate:

1. The ability to comply with all applicable federal and state laws and regulations.
2. The ability to comply with all industry standards.

The contractor must provide:

1. Qualified, experienced supervisor and foreman.
2. Supervisors and foreman that understand all aspects of the contracted vegetation maintenance activities and who are responsive to the guidance of the DPW.
3. Supervisors/foreman who effectively manage crews to ensure the satisfactory completion of the contract.
4. Supervisors/foreman who effectively communicate with the public using professionalism and courtesy.
5. Appropriately licensed or certified field supervisors/foreman.
6. Personnel applying herbicides must hold a Connecticut Operator's pesticide license and must work under the on-site supervision of a Supervisory Certificate applicator.
7. Qualified, experienced and/or trained field crews with appropriate licenses and/or certifications. "Qualified" means crew personnel:
 - a. Trained to recognize and identify incompatible target *and* compatible vegetation
 - b. Knowledgeable in the safe and proper use of mechanical and chemical equipment and methods.
8. Field crews that conduct themselves professionally at all times.
9. Equipment that meets all specifications required to complete the contracted vegetation maintenance activity(s).

10. Equipment maintained at the highest practical level of efficiency and effectiveness.

7.2 OPERATIONAL GUIDELINES

The DPW sets forth the following set of operational guidelines. This set of guidelines does not preclude additional guidelines found throughout this document, or additional industry standards and regulations not included in this section. It is merely a guideline of the minimum standards required of all contractors working under this VMP.

Supervision/Responsibility

1. The following individual is responsible for monitoring, supervising and coordinating vegetation management programs:

Superintendent Pollution Control or designated alternate
Town Hall
1540 Sullivan Avenue
South Windsor, CT 06074

2. The DPW will inform the contractor(s) which ROWs will be treated, the range of treatment dates and the possible methods, materials and mixing rates. The DPW will supply treatment restrictions data, maps and written instructions outlining any special treatment considerations or instructions for each ROW.
3. No work will begin until the contractor has the appropriate data, permits, restriction lists, mixing rate instructions and licensed staff.
4. Both the Contractor and the DPW are responsible to ensure that vegetation maintenance operations are conducted in a professional, safe, efficient manner, with special attention directed towards minimal environmental impact and property owner concerns.
5. All operations will be supervised by DPW personnel or their designated representatives through regular inspections and these individuals have the right to prescribe corrective steps where necessary.

Equipment

6. Instead of dictating the exact equipment models and calibration methods, The DPW recognizes the vast variety and performance of mechanical and herbicide application equipment, therefore:
 - a. The contractor shall provide the most appropriate application equipment, calibrated to effectively and legally control target vegetation
 - b. The DPW reserves the right to inspect all equipment.

Safety

7. Contractors shall strictly adhere to all mandated safety precautions directed towards the public, the applicator and the environment.
8. Contractors shall follow all current, applicable ANSI standards for their particular vegetation maintenance operation. At a minimum, these include, but are not limited to Z-133 *Safety Standard* and A300 *Integrated Vegetation Management – Part 7* and ANSI/OPEI B71.4-2004 Commercial Turf Care Equipment - Safety Specifications. Most applicable ANSI standards related to this VMP can be found at the www.ISA-Arbor.com.
9. Proper Personal Protective Equipment shall be worn during all operations
10. Proper Connecticut roadside visibility procedures, equipment and clothing will be used at all times.
 - a. Per section 11.3 of the *Utility Accommodation Manual CT DOT*²¹:

All workers within the right of way of a highway who are exposed to either traffic or to construction equipment shall wear high-visibility apparel. High-visibility safety apparel means personal protective safety clothing that is intended to provide worker conspicuity during both daytime and nighttime usage. The clothing shall meet the Performance Class 2 or 3 requirements of the ANSI/ISEA 107-2004 publication entitled American National Standard for High-Visibility Safety Apparel and Headwear (<http://www.safetysafetyequipment.org/hivisstd.htm>).

Roadside

11. Roadside Traffic Control: Contractors will comply with the traffic control plans included in
 - a. the *Utility Accommodation Manual CT DOT* located at: <http://www.ct.gov/dot/lib/dot/documents/dutilities/ACCOMODATION.pdf> .and
 - b. *State Traffic Commission Regulations Page 53 Part IV Traffic Control for Highway Construction and Maintenance*²² located at: <http://www.ct.gov/dot/lib/dot/documents/dstc/part4.pdf>.

Treatment Method Requirements

12. Herbicides shall be handled and applied only in accordance with the manufacturers' labeled instructions.
13. Crews shall at all times, exercise good judgment and common sense and shall immediately cease operations if adverse conditions or other circumstances warrant.
14. In locations where individual restrictions or procedures overlap and/or multiple restrictions apply, the more stringent restrictions and all applicable procedures shall be employed.
15. Impact mitigation measures shall be implemented during routine vegetation

²¹Utility Accommodation Manual CTDOT – Utilities Section 2800 Berlin Turnpike, Room 3214 Newington, CT 06131-7546.

²²State Traffic Commission Regulations Page 53 Part IV *Traffic Control for Highway Construction and Maintenance*.

maintenance operations and when possible during emergencies.

16. Crews shall exercise care to ensure that low-growing compatible vegetation and other non-target organisms are not unreasonably affected (within the constraints of the treatment method).

17. If less than the desired control is achieved per the contract specifications, the contractor will be held responsible to re-treat or remove the remaining vegetation to The DPW's satisfaction.

Easement Boundaries

Easement Boundaries will be marked/confirmed in the field prior to treatments by trained professionals using all appropriate documentation. Where appropriate, this will be accomplished by measuring outward from the manhole covers which are the centerline of the easement.

Property

18. As a courtesy, knock on landowner's doors when working through the area.

19. Permission must be obtained for ingress and egress if entering the ROW from private land.

20. Always politely make sure when receiving permission for ingress, egress, treatments, etc. over/on property on or off the easement, that the individual involved has the right to give these permissions (landowner, business owner, etc.).

21. Follow all BMP's in Sections 5 & 6 about easements, permissions, etc.

22. All gates and bar-ways shall be immediately closed.

23. Exercise care to prevent the rutting or destruction of roadways, fields or any other form of access.

24. No litter of any kind will be left on the ROW or adjoining property.

Landowners

25. Land owners shall be treated with courtesy and respect at all times.

26. When addressing inquiries or complaints:

- a. All crew members shall direct the individual to the field supervisor/foreman.
- b. The field supervisor/foreman will explain the program in a polite and professional manner.
- c. If the field supervisor/foreman deems the situation requires additional assistance, the DPW representative shall be contacted immediately.
- d. If a property owner demands operations cease, the field supervisor/foreman shall remove the crew and equipment from the property and contact the DPW's representative immediately.
- e. If a non-property owner aggressively demands operations cease, the field supervisor/foreman shall cease operations and contact the DPW's representative

immediately, but the crew does not need to leave the property unless it is deemed unsafe or unwise for them to remain.

- f. The crew shall not return to that location until given clearance by the DPW.
- g. If the situation is such that it is not easily resolved or the supervisor/foreman feels it is at least noteworthy, at a minimum, a narrative shall be include on the daily paperwork.
- g. Any resulting landowner agreements will be included in the DPW's permanent records and will be given to contractors as part of the bid package (the successful contractor(s) will need more exact information before maintenance activities begin).

Contract Compliance

- 27. Failure to follow these operational guidelines is grounds for removal of the crew from the treatment site and potentially termination of the vegetation management contract.

7.3 REGULATIONS

The DPW relies on independent contractors for vegetation management operations and requires, in a contractual agreement, that contractors comply with all applicable federal and state laws and regulations. Therefore, the following is only a partial list of pertinent federal, state and municipal laws and regulations (for example, contractor(s) shall also follow all OSHA and DOT laws and regulations and all regulations listed elsewhere in this VMP):

- 1. See Appendix 8: *Pertinent Pesticide Statutes and Regulations for Certified Commercial Supervisors and Arborists*. Also located at:
http://www.ct.gov/deep/lib/deep/pesticide_certification/supervisor/stats_regs_superv_and_arborists_rev_may_2008.pdf
- 2. See Appendix 9: *Guidelines for Disposal of Terrestrial Invasive Plants*. Also located at: <http://ccetompkins.org/resources/guidelines-for-disposal-of-terrestrial-invasive-plants-2011>
- 3. Connecticut Tree Laws (index)
<http://www.ct.gov/deep/lib/deep/forestry/tableofcontentshyperlinked.pdf>
- 4. Connecticut Chapter 495, Endangered Species:
http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323486&deepNav_GID=1628
- 5. See Appendix 14: South Windsor Inland Wetland/Watercourse and Conservation Regulations:
http://www.southwindsor.org/pages/swindsorct_planningdept/TWA%20Regs%20app%2010-18-00.pdf
- 6. Town of South Windsor Sanitary Sewer Rules and Regulations:
http://www.southwindsor.org/pages/swindsorct_dpw/wpca/Rules_Regulations.pdf
- 7. U.S. EPA Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):

<http://www.epa.gov/agriculture/lfra.html>

8. U.S. EPA Clean Water Act: <http://www2.epa.gov/laws-regulations/summary-clean-water-act>

7.4 NOTIFICATION

The DPW will notify all easement owners before any non-emergency vegetation maintenance activities.

7.5 PAPERWORK

The field supervisor/foreman must complete daily reports that fulfill the requirements set forth in the current Connecticut *Use of Pesticide* regulations, regardless of the type of vegetation maintenance activities. Any changes or additions to regulatory paperwork requirements will be followed in the future:

1. Date, name and address of vegetation management contractor(s)
2. Identification of site or work area
3. List of crew members (applicable licenses must be on file at the DPW, pesticide license numbers must be in the report)
4. Type of equipment and hours used, both mechanical and chemical
5. Application/Treatment method and description of target vegetation
6. If applicable, amount, concentration, product name of herbicide(s), adjuvants, and dilutants (EPA registration numbers must be on file)
7. Weather conditions (three times over the course of an 8 hour day)
8. Notation of any unusual conditions or incidents, including public inquiries
9. Record and/or verify of *sensitive areas* on ROW maps.

7.6 BASIC RESOURCES FOR MAINTENANCE CONTRACTORS

1. VMP
2. Treatment Specification
3. RFP documentation
4. Treatment Maps
5. When necessary, as-Built Plan and Profile Drawings
6. New information gathered in the notification process
7. If any, Current Special Endangered, Threatened or Species of Special Concern Recommendations
8. Landowner Agreements

8.0 ROW WILDLIFE HABITAT

Between reforestation and urbanization, early successional ecological communities, particularly relatively stable ones are becoming increasingly rare throughout New England. This has led to a loss of habitat for many native plant, invertebrate and vertebrate species.²³ One of the first steps in the disciplines of wildlife conservation and restoration ecology is to stop this progression for native species *before* they become threatened or endangered. Fortunately, ROWs managed for this vegetative type are some of the few remaining habitats for species that require early successional ecological communities for at least part of their life cycle.

As a rule, succession and disturbance are the factors in ecological succession that lead to ecological diversity or biodiversity. When out of balance in either direction, biodiversity decreases.²⁴ This is as true for the ecology of a forest as it is for a meadow or wetland; only the wildlife activity easily visible to the human eye is different. Some communities and species are dependent on ongoing disturbance, of either human or natural origin, for their continued abundance or even presence on the landscape.

Many plant and invertebrate species tend to be single or limited habitat specialists that rely on disturbance to maintain their early successional habitats and thus their populations. Examples include Common Moorhens and Grasshopper Sparrows. This issue is so important that the State of Connecticut began a *Grassland Habitat Initiative* in 2006 in the effort to save and protect this disappearing wildlife habitat (see Appendix 7).²⁵

Likewise, few New England wildlife species are solely forest specialists.²⁶ Throughout their life cycle the majority of species actually use a mix of heterogeneous habitat types from

²³David R. Foster and John D. Aber, eds. Forests in Time: The Environmental Consequences of 1,000 Years of Change in New England. New Haven: Yale University Press, 2004.

²⁴Tom Wessels, Reading the Forested Landscape: A Natural History of New England, The Countryman Press: Woodstock, VT: 1997, p. 17-18; Stephen H. Spurr & Burton V. Barnes, Forest Ecology, Krieger Publishing Co., Malabar, FL, 1992.

²⁵Connecticut Department of [Energy and] Environmental Protection. "Grassland Habitat Initiative," 2006.

²⁶Henry Barbour, Tim Simmons, Patricia Swain and Henry Woolsey. Our Irreplaceable Heritage: Protecting Biodiversity in Massachusetts. Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, 1998; Michael L. Morrison. Restoring Wildlife: Ecological Concepts and Practical Applications (The Science and Practice of Ecological Restoration Series), Society for Ecological Restoration International, June 2009; Craig A. Harper, "Strategies for Managing Early Succession Habitat for Wildlife," Weed Technology 2007 21:932-937; James D. Oehler ed., Darrel F. Covell, ed, Steve Capel, ed and Bob Long, ed. Managing Grasslands, Shrublands and Young Forests for Wildlife: A Guide for the Northeast. The Northeast Upland Habitat Technical Committee, 2006: Chapter 11; Malcolm L. Hunter and James P. Gibbs, Fundamentals of Conservation Biology. Blackwell Publishing, 2007.

forests to wetlands, waterbodies and everything in between.²⁷ Examples include white tailed deer, wild turkeys, grouse, birds of prey, and turtles. The DEEP wildlife library website also has some useful fact sheets on wildlife openings (see Appendix 7).

To protect this native wildlife in a culturally acceptable manner, therefore, we need to create disturbances. New England's Tom Wessels states in his book Reading the Forested Landscape, "Even though humans are responsible for widespread ecosystem disturbance, we tend to have a cultural bias against natural disturbances."²⁸ Due to this cultural bias; the "popular culture" belief that only trees are good for wildlife; the demise of agriculture as a major economic factor in New England; the suppression of fires, floods and wide-scale natural disturbance, and increased urbanization, we have a responsibility to protect the biodiversity of our native ecosystems.

When and where a cultural landscape can benefit both humans and wildlife, the results are sustainable restoration ecology. South Windsor's ROWs fit this niche. In fact, this IVM program is built upon extensive, long term studies of IVM's effects on wildlife and the environment.²⁹ Like restoration ecology, wildlife management is often habitat management and habitat management is vegetation management.

Based on over fifty years of wildlife conservation research throughout the United States, the U. S. EPA has endorsed the selective use of IVM with an herbicide component as an appropriate method of vegetation control that can benefit public safety.³⁰ The oldest studies began in Pennsylvania during the 1950's under W.C. Brambles and W.R. Burns and these studies

²⁷J Tew, U. Brose, V. Grimm, K. Teilbörger, M.C. Wichman, M Schwager and F. Jeltsch, "Animal Species Diversity Driven by Habitat Heterogeneity/Diversity: the Importance of Keystone Structures," Journal of Biogeography (U. Biogeogr.), 2004: 31, 79-92.

²⁸ Tom Wessels, p. 18.

²⁹ Robert A. Askins. Restoring North America's Birds: Lessons from Landscape Ecology, Yale University Press, New Haven, CT, 2000; W.C. Bramble and W.R. Burns, A Long-term Ecological Study of Game Food and Cover on a Sprayed Utility Right-of-way. Purdue University. 1974. Bulletin No. 918:16; Richard H. Yahner. "Wildlife Response to More than 50 years of Vegetation Maintenance on a Pennsylvania U.S., Right-of-Way," Journal of Arboriculture 30(2), March 2004: 123; James S. Marshall and L.W. Vandruff. "Impact of Selective Herbicide Right-of-Way Vegetation Treatment on Birds." Environmental Management, December 2002. Vol. 30, No. 6: 801-806; Robert A. Askins. "Sustaining Biological Diversity in Early Successional Communities: The Challenge of Managing Unpopular Habitats," Wildlife Society Bulletin Vol. 29, No. 2, Summer, 2001: 407-412.

³⁰ USDA, Forest Service. "Pesticide Background Statements, Volume 1. Herbicides," Agriculture Handbook Number 633, 1984; USEPA. Environmental Stewardship Strategy for Electric Utility Rights-of-Way, Pesticide Environmental Stewardship Program, Edison Electric Institute Vegetation Management Task Force, August 1996. U.S. Environmental Protection Agency. "Fact Sheet: Benefits of Integrated Vegetation Management on Rights-of-Way (EPA 731-F-08-011)."

are still ongoing.³¹ Other researchers include ROWs in their broader studies of declining wildlife. For example, Dr. Robert Askins of Connecticut College is an expert on American birds. In his 2000 publication Restoring North America's Birds, he mourns what he calls "Another Quiet Decline" and the fact that "The decline of shrubland [and grassland] songbirds has not resulted in a flurry of efforts to save their habitat."³² He goes on to credit ROWs maintained under selective IVM programs as one of the remaining habitats for these bird species.³³

In conclusion, the DPW has the opportunity to simultaneously make their ROWs safer and more efficient while furthering the efforts to protect our native wildlife; the two are compatible. Even in areas where the DPW may decide to actively promote the habitat of a specific species in conjunction with an authorized entity such as the DEEP or a university, the flexibility of the IVM program described in this VMP makes this possible.

8.1 CONNECTICUT DEEP RESOURCES:

1. Endangered Species webpage:

http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323462&deepNav_GID=1628%20

2. Fact Sheets:

http://www.ct.gov/deep/cwp/view.asp?a=2723&q=325718&deepNav_GID=1655#ESFact

3. Wildlife openings

http://www.ct.gov/deep/lib/deep/wildlife/pdf_files/outreach/fact_sheets/openings.pdf

http://www.ct.gov/deep/lib/deep/wildlife/pdf_files/outreach/fact_sheets/daylgt.pdf

http://www.ct.gov/deep/lib/deep/wildlife/pdf_files/nongame/grasshaboct06.pdf

8.2 CLASSIFYING ENDANGERED, THREATENED AND SPECIES OF SPECIAL FOUND ON ROWS

In the effort to protect native habitats and determine the IVM choices available for non-emergency vegetation maintenance operations, the DPW will adhere to the following classifications developed by the endangered species review biologist, Matthew Hickler who works closely with endangered species programs throughout New England.³⁴ Broadly speaking, there are two scenarios where ROWs coincide with rare species: (1) independently from the

³¹See Examples in Bibliography including anything by Brambles and Burns, Vandruff and Nowak.

³²Robert A. Askins. Restoring North America's Birds: p. 32.

³³Ibid., pp. 48-53.

³⁴Classification developed by Matthew Hickler, Ph.D., Independent consultant and MANHESP approved field review biologist.

ROW and its maintenance and (2) where important habitats are the result of vegetation management programs.

1. Native, Natural Rare Species Habitat

a. Not Dependent upon the ROW:

1. Avoid damaging the habitat's ability to support rare species
2. Avoid "taking" (destroying/damaging) the rare species

b. ROW vegetation management provides value:

1. Manage to maintain the habitat
2. Limited "takes" (under the direction of the DEEP) may be necessary to maintain the health of the entire population.

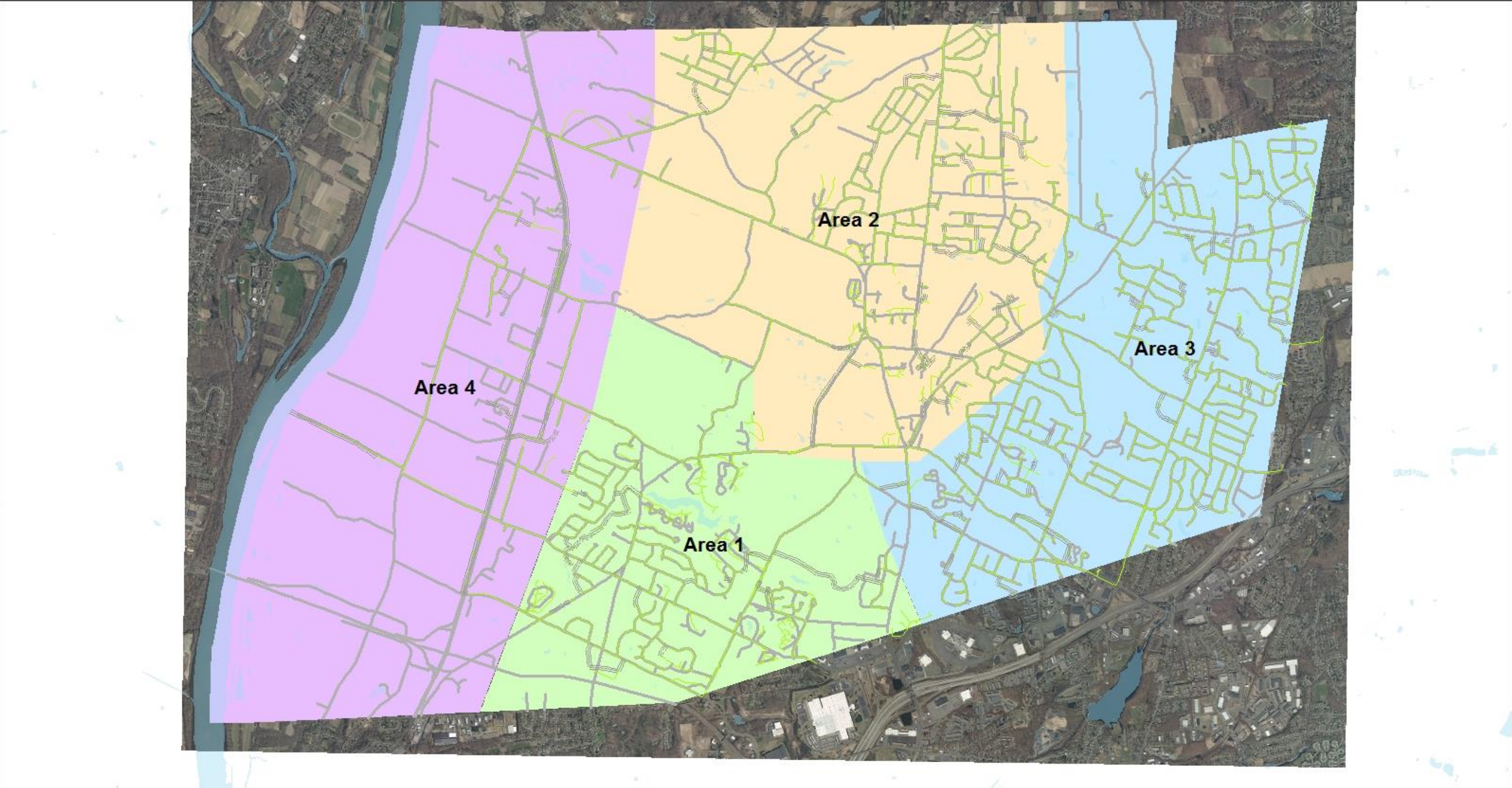
2. Habitat exclusively provided by ROW vegetation management programs

- a. Carefully continue to utilize the management techniques that created these habitats
- b. Limited "takes" (under the direction of the DEEP) may be necessary to maintain the health of the entire population.

3. Species-Groups (functional-types): occurrences of many rare species are highly unpredictable. These species are not amenable to a habitat management strategy. However, they can be grouped based on similar biology and ecological responses and worked with as management units.

4. Biologist Review Required: some rare species occur so infrequently on ROWs, or are otherwise not amenable to protection with generic plans. These will need individual, site specific plans and individual consideration whenever management is scheduled; these are primarily plants.

APPENDIX 1: TOWN AND AREA MAP




Legend

- | | | | |
|---|--------|---|------------------------------------|
|  | Area 1 |  | Sanitary Sewer Lines |
|  | Area 2 |  | Vegetation Treatment Rights-of-Way |
|  | Area 3 |  | Roads |
|  | Area 4 |  | Waterbodies |



South Windsor 1:40,000
Sanitary Sewer Line
Vegetation Management Plan
Town Wide Area Map



APPENDIX 2: INVASIVE SPECIES FACT SHEET

http://cipwg.uconn.edu/invasive_plant_list/

APPENDIX 3: BMPS FOR WILDLIFE



Town of South Windsor

1540 SULLIVAN AVENUE • SOUTH WINDSOR, CT 06074

TELEPHONE (860) 644-2511

Vernal Pools

Vernal pools are water bodies that are inundated with water from late February through early July. Generally they are adjacent to a wooded area. This limited period of inundation allows amphibians such as wood frogs, and spotted salamanders to lay eggs, hatch into larvae and emerge into adults without predation by fish. Amphibians are important for two reasons, one because they are low on the food chain providing food for a variety of wildlife species, two, because amphibians respire through their skin, they are sensitive to chemical changes in the environment and can be good indicators of environmental health. For these reasons, vernal pools are considered important natural resources and are afforded an elevated level of protection by state statutes.

Best Management Practices:

Right of way clearing should be avoided during times of amphibian activity in and around vernal pools. This would be during the months of mid-February thru mid-July. Clearing activities should be scheduled from August thru January.

Turtle breeding Areas

Areas with sandy soil adjacent to ponds or large swamps can be potential breeding grounds for turtles. Egg laying typically occurs in the early summer with hatching of the eggs between August and October. Clearing activities involving heavy equipment should be avoided during these times.

APPENDIX 4: “PERTINENT PESTICIDE STATUTES AND REGULATIONS”

http://www.ct.gov/deep/lib/deep/pesticide_certification/supervisor/stats_regs_superv_and_arborists_rev_may_2008.pdf

APPENDIX 5: “GUIDELINES FOR DISPOSAL OF TERRESTRIAL INVASIVE PLANTS”

<http://ccetompkins.org/resources/guidelines-for-disposal-of-terrestrial-invasive-plants-2011>

Appendix 6: Best Management Practices for Landowners

WORKING TOGETHER TO PROTECT OUR SANITARY SEWER SYSTEM

The town of South Windsor Connecticut is serviced by over 130 miles of sanitary sewer pipelines. In the construction of this modern convenience, the town duly negotiated easements on the private property through which these pipelines pass. In order to maintain these easements, protect them from damage and protect our citizens from emergencies and service disruptions, the town and landowners need to act as a team, especially when it comes to landscaping. Trees, shrubs, fences and even mulch or compost piles can make it difficult for the town to inspect and maintain the pipeline. Woody vegetation with strong root systems can potentially infiltrate pipe joints, cause clogs or even breach the pipes. Therefore, maintaining the appropriate landscape is a vital part of fulfilling state, municipal and federal laws created to protect our citizens from sanitary sewer breaches and potential overflows or leaks.



A Right-of-way Covered in Woody and Invasive Plant Species

To maintain these vital pipeline easements, the town has implemented a Vegetation Management Plan based on an Integrated Vegetation Management (arboricultural IPM) approach. This approach has been, developed, utilized and continuously evolved over the past fifty-years throughout the Northeast and Connecticut. These well-established arboricultural practices take into consideration the landscape and the cultural use of the landscape by town residents. This plan can be viewed at:

<http://www.southwindsor.org/public-works>

Within this plan there are guidelines for both the town and landowners on how easements can be maintained and utilized, while also providing for the protection of the pipeline. For example, cross-country sections of the pipeline will be maintained by the town, as necessary, but where the easement crosses fields or private property, more extensive landscaping maintenance, including lawns, wildflower patches or other compatible plantings may be encouraged.

WHAT CAN YOU DO TO HELP?

In this effort, as a guide and service to landowners, the town has set forth the following landscaping rules within the pipeline easement. For the most part, the best landscaping within the easement is a well mowed lawn or a field or meadow with taller grasses and herbaceous growth.

To protect the pipeline, before changing the landscaping in any yard, landowners should locate the pipeline and easement. How can you do this?

1. If you have access to a property survey, this is one place to start.
2. As a rule these easements average 20 feet wide, some are smaller.
3. If you know the location of the manhole covers that run along the pipeline, this is another indicator. If you can locate two covers or more this will indicate the relative line of the pipeline.
4. If in need of assistance, please contact the Department of Public Works, Pollution Control Division.

General guidelines for acceptable landscaping on the pipeline easement:

1. Preferred:
 - a. Mowed lawns.
 - b. Fields of taller grasses and herbaceous plants: wildflowers, low bush-wild blueberries (under 12" tall), sweet fern, cinnamon ferns, wild strawberries, etc.
 - c. No mulch or compost piles over manhole covers. Concealed manhole covers can cause un-necessary delays during emergencies, and any materials used to conceal the covers are likely to be damaged or lost during emergency maintenance events.
 - d. Fences, shrubs and trees are allowable on the edge of the easement in locations that will not interfere with the integrity of the pipe.
 - e. Fences should have gates approved by the Department of Public Works, Pollution Control Division or fences may need to be removed in an emergency with no obligation on the part of the town to replace it.

2. Restricted:

- a. All woody vegetation over 12” in height: e.g. trees, shrubs, vines, brambles (blackberries, raspberries, Multiflora Rose).
- b. Invasive species.
- c. Vegetation over manhole covers.
- d. Mulch, Compost or Soil over the manhole covers.
- e. Fences within the easement/over the pipeline. (If an appropriately sized gate is provided, allowing access to the pipeline easement for maintenance purposes, and said gate is provided with a town lock to allow authorized access, this restriction may be waived.)
- f. Buildings within the easement/over the pipeline.

3. Grandfathered items:

- a. As a rule, restricted vegetation and related outbuildings (garages, porches, sheds, etc) and fence lines within the easement are unfortunately not “grandfathered.” If there are any questions on this issue or the restricted item is not interfering with access or the pipe, please call the Department of Public Works, Pollution Control Division and we will visit your property and see what is possible.

BENEFITS BEYOND PROTECTING THE PIPELINE

If we all work together, there will be some changes to the current landscape, but the resulting landscape can benefit both the town and its citizens. Areas of almost impenetrable trees, shrubs and invasive species will be cleared and converted to open spaces that can be enjoyed by the landowners. Wildlife will also benefit from an increase in habitat. The battle to control invasive plant species will benefit from their removal and we can start the process of taking back our native landscape from invasive plant species.

Much of the wildlife in New England is dependent upon low-growing landscapes for at least part of their life cycle; for example turkeys are both a wood land and field species. According to the National Wild Turkey Federation, “Wild turkeys like open areas for feeding, mating and habitat. They use forested areas as cover from predators and for roosting in trees at night. A varied habitat of both open and covered area is essential for wild turkey survival.”

Additionally, Connecticut is currently experiences an invasive plant species crisis. Invasive Species are, by their nature, aggressive and fast growing; they spread rapidly along easement corridors, have few to no natural pests or diseases, and can be difficult to remove or control. As such, they pose a significant threat to Connecticut’s natural diversity of native plants, animals and insects. One particular species that is taking over the woodlands in South Windsor is Oriental Bittersweet (*Celastrus orbiculatus*). This is particularly obvious driving down Route 5 where the trees are being engulfed by this aggressive, woody vine. In addition to its negative impact on wildlife, bittersweet vines makes walking through the woods next to impossible in some locations.



Other serious invasive plant pests in Connecticut include, but are not limited to, Autumn and Russian Olives, Japanese Knotweed, various invasive Honeysuckles, Garlic Mustard, Japanese Honeysuckle vines, Burning Bush, Buckthorn trees, Japanese and European Barberries and thickets of Multiflora Rose. Control of these species along the pipeline easements will have a significant positive impact on the environment.

The Department of Public Works, Pollution Control Division would like to thank landowners with sanitary sewer easements on their property in advance for their help with this improvement project. Long-term maintenance of the landscape in our easements will benefit us all.

FOR MORE INFORMATION

South Windsor Department of Public Works, Pollution Control Division:

http://www.southwindsor.org/pages/swindsorct_dpw/pollutioncontrol

South Windsor Sewer Regulations:

http://www.southwindsor.org/pages/swindsorct_dpw/WPCA/Rules_Regulations.pdf

South Windsor Department of Public Works, Pollution Control Division, Sanitary Sewer Line Vegetation Management Plan:

http://www.southwindsor.org/pages/swindsorct_dpw/pollutioncontrol

National Wild Turkey Federation Wild Turkey Facts:

http://www.nwtf.org/all_about_turkeys/wild_turkey_facts.html

Connecticut Department of Energy and Environmental Protection Invasive Species:

http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323494&deepNav_GID=1641%20

Northeast Forest Service Forest Invasive Plant Resource Center:

<http://na.fs.fed.us/spfo/invasiveplants/index.asp>

Oriental Bittersweet Fact Sheet:

<http://na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/oriental-bittersweet.pdf>

Appendix 7: Connecticut Wildlife and Habitat Fact Sheets

<http://www.ct.gov/deep/cwp/view.asp?a=2723&q=326214>

<http://www.ct.gov/deep/cwp/view.asp?a=2723&q=326210>

Appendix 8: “Inland Wetland/Water Course and Conservation Regulations”

http://www.southwindsor.org/pages/swindsorct_planningdept/IWA%20Regs%20app%2010-18-00.pdf

Appendix 9: Bibliography

Bibliography

- American National Standards Institute. ANSI A300 Standards Part 7 Integrated Vegetation Management. ANSI, 2006.
- American National Standards Institute. ANSI A300 Part 1 Pruning-2001.
- American National Standards Institute ANSI Standard for Arboricultural Operations—Safety Requirements (ANSI Z133.1-2006).
- Askins, Robert A. Restoring North America's Birds: Lessons from Landscape Ecology, Yale University Press, New Haven, CT, 2000.
- Askins, Robert A. "Sustaining Biological Diversity in Early Successional Communities: The Challenge of Managing Unpopular Habitats," Wildlife Society Bulletin Vol. 29, No. 2, Summer, 2001: 407-412.
- Barbour, Henry; Simmons, Tim; Swain Patricia; and Woolsey, Henry. Our Irreplaceable Heritage: Protecting Biodiversity in Massachusetts. Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, 1998.
- Bramble, W.C. and Burns, W.R. "A Long-term Ecological Study of Game Food and Cover on a Sprayed Utility Right-of-Way," Bulletin No. 918, Purdue University, 1974:16.
- Bramble, W.C., Burns, W.R., Hutnik, R.J., and Liscinsky, S.A. "Interference Factors Responsible for Resistance of Forb-Grass Cover Types to Tree Invasion on an Electric Utility Right-of-Way," Journal of Arboriculture Vol. 22 No. 2, March 1996: 99-105.
- Chasko, Gregory G., and J. Edward Gates. Avian Habitat Suitability along a Transmission Line Corridor in an Oak-Hickory Forest Region. Washington: Wildlife Society, 1982.
- Coder, Kim D. Allelopathy in Trees and Forests; A Selected Bibliography. University of Georgia, April 1999.
- Confer, John L. "Management, Vegetative Structure and Shrubland Birds of Rights-of-Way," 7th International Symposium on Environmental Concerns in Rights-of-Way Management, 1999.
- Connecticut Department of [Energy and] Environmental Protection. "Grassland Habitat Initiative," 2006.
- Connecticut Department of Transportation. *Utility Accommodation Manual CTDOT – Utilities* Section 2800 Berlin Turnpike, Room 3214 Newington, CT 06131-7546.
- Connecticut; State Traffic Commission Regulations. Part IV Traffic Control for Highway Construction and Maintenance, page 53..

Cornell University, Entomology Department Fact Sheet:

<http://www.biocontrol.entomology.cornell.edu/what.html>.

CVPS. "Central Vermont Public Service Corporations 2006 Strategy; T&D Forestry," Rutland, VT, 2006.

Deubert, K.H. Studies on the Fate of Garlon 3A and Tordon 101 Used in Selective Foliar Application in the Maintenance of Utility Rights-of-Way in Eastern Massachusetts. Final Report prepared for New England Electric et al., 1985.

Deubert, K. H. and Corte-Real, L. "Soil Residues of Picloram and Triclopyr after Selective Foliar Application on Utility Rights-of-Way," Journal of Arboriculture Vol. 12, 1986: 269–272.

Environmental Consultants, Inc. Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality on New York State Powerline Rights-of-Way. Final Report for Empire State Electric Energy Research Corporation, August 1991.

Environmental Consultants, Inc. Study of the Impact of Vegetation Management Techniques on Wetlands for Utility Rights-of-Way in the Commonwealth of Massachusetts. Final report prepared for New England Electric et. al., 1989.

Foster, David R., "Conservation Issues and Approaches for Dynamic Cultural Landscapes," Journal of Biogeography, Vol. 29, Nos. 10/11, October/November 2002: 1533.

Foster, David R, ed. "Insights from Historical Geography to Ecology and Conservation: Lessons from the New England Landscape." Blackwell Publishing: Special publication of articles from Journal of Biogeography, Vol. 29, Nos. 10/11, October/November 2002.

Foster, David R. and Aber, John D. eds. Forests in Time; The Environmental Consequences of 1,000 Years of Change in New England. New Haven: Yale University Press, 2004.

Goodrich-Mahoney, John W.; Abrahamson, Lawrence, P.; Ballard, Jennifer I.; Tikalsky, Susan M. 8th International Symposium Environmental Concerns in Rights-of-Way Management, 2004.

Harper, Craig, A. "Strategies for Managing Early Successional Habitat for Wildlife," Weed Technology Vol. 27, 2007: 932-937.

Harrison Biotech, Inc. A Generic Environmental Impact Report on the Control of Vegetation on Utility and Railroad Rights-of-Way in the Commonwealth of Massachusetts. Final Report prepared for the Department of Food and Agriculture, Commonwealth of Massachusetts, 1985.

Hickler, Matt, MANHESP approved Review Biologist, Reports for TransCanada, National Grid, NStar Electric, Northeast Utilities under 321 CMR 10.00 Massachusetts Endangered Species Act Regulations. (Also Reports in NH and VT), 2006-2010.

- Hunter, Malcolm L. and Gibbs, James P. Fundamentals of Conservation Biology. Blackwell Publishing, 2007.
- International Society of Arboriculture. Best Management Practices: Integrated Vegetation Management. ISA, 2007.
- Johnstone, Richard A. "Integrated Vegetation Management," www.UtilityArborist.org, Utility Arborists Association, Summer 2008.
- Kremidas, Lori Jean. "The History of South Windsor Connecticut: Settlement to Incorporation 1634 – 1845," Historiography, March 25, 1981 (Dr. Hebert Photos by Debbie Kimball).
- McAvoy, Richard, Chairman. *Invasive Plants Council Twelfth Annual Report December 16, 2014*.
- Marshall, James S. "Effects of Powerline Right-of-Way Vegetation Management on Avian Communities, 7th International Symposium on Environmental Concerns in Rights-of-Way Management, 1999.
- Marshall, James S. and Vandruff, L.W. "Impact of Selective Herbicide Right-of-Way Vegetation Treatment on Birds," Environmental Management Vol. 30, No. 6, December 2002: 801-806.
- Massachusetts Department of Agricultural Resources. Surface Water Monitoring of Glyphosate Used in Rights-of-Way Railroad Vegetation Management (2005–2006), November, 2006.
- Morrison, Michael L. Restoring Wildlife: Ecological Concepts and Practical Applications (The Science and Practice of Ecological Restoration Series). Society for Ecological Restoration International, June 2009
- Morrison, Michael L. Wildlife Restoration: Techniques for Habitat Analysis and Animal Monitoring. Washington: Island Press, 2002.
- National Grid USA Electric Companies. Utility Transmission Forestry Herbicide Use Summary Records, 1960s to 2008.
- Nickerson, Norton H. "Impacts of Vegetation Management Techniques on Wetlands in Utility Rights-of-way in Massachusetts," Proceeding of the International Society of Arboriculture Annual Conference, August, 1991.
- Nickerson, Norton H., Moore, G.E. and Cutter, A.D. Study of the Environmental Fates of Herbicides in Wetland Soils on Electric Utility Rights-of-Way in Massachusetts over the Short Term. Final Report prepared for New England Electric et.al., December 1994.

- Nowak, Christopher A. "Three Decades of Research on New York State ROWs," Draft, ca 2007, Integrated Vegetation Management (IVM), Research & Development Program, State University of New York, College of Environmental Science and Forestry (SUNY-ESF), Syracuse, New York.
- Nowak, Cristopher A. and Abrahamson, L.P. "Vegetation Management on Electric Transmission Line Rights-of-Way in New York State: The Stability Approach to Reducing Herbicide Use," Proceedings of the International Conference on Forest Vegetation Management, Auburn University, April 1993.
- Nowak, Christopher A. and Benjamin D. Ballard. "A Framework for Applying Integrated Vegetation Management on Rights-of-way," *Journal of Arboriculture* 31 (1) January 2005.
- Oehler, James D., ed; Darrel F. Covell, ed; Steve Capel, ed, and Bob Long, ed. Managing Grasslands, Shrublands and Young Forests for Wildlife; A Guide for the Northeast. The Northeast Upland Habitat Technical Committee, 2006.
- Priestley, Wendy. TransCanada New England Vegetation Management Plan; National Grid Five Year Massachusetts Vegetation Management Plan 2014-2018; NSTAR Electric Five Year Massachusetts Vegetation Management Plan, 2013-2017.
- Spur, Stephen H. and Barnes, Burton V. Forest Ecology. Krieger Publishing Co., Malabar, FL, 1996.
- Tew, J., Brose U., Grimm V., Teilbörger, K., Wichman, M.C., Schwager, M. and Jeltsch, F. "Animal Species Diversity Driven by Habitat Heterogeneity/Diversity: The Importance of Keystone Structures," Journal of Biogeography (U. Biogeogr.), 2004: 31, 79-92.
- TransCanada Hydro Northeast, Inc. Utility Transmission Forestry Herbicide Use Summary Records 1990-2009. Compiled by Vegetation Control Service, Inc., 1990-2009.
- U. S. Bureau of the Census, "2010 U.S. Census" <http://www.census.gov/2010census/data/> (accessed February 2015).
- United States. *Public Law 106–224—June 20, 2000, Title IV—Plant Protection Act*.
- United States. Department of Agriculture. "Pesticide Background Statements, Volume 1. Herbicides," Agriculture Handbook No. 633, 1984.
- United States. Department of Agriculture, Natural Resources Conservation Service. Maine NRCS Action Plan to Conserve: Identified Priority Fish and Wildlife Species and Habitat; Maine's Comprehensive Wildlife Conservation Strategy. Maine NRCS with assistance from the State Technical Committee and Local Work Groups, June 2006.

United States Environmental Protection Agency. Environmental Stewardship Strategy for Electric Utility Rights-of-Way. Pesticide Environmental Stewardship Program, Edison Electric Institute Vegetation Management Task Force, August 1996.

United States Environmental Protection Agency. "Fact Sheet: Benefits of Integrated Vegetation Management on Rights-of-Way (EPA 731-F-08-011)," October 2008.

United States Environmental Protection Agency. "Integrated Vegetation Management Practices around Utility Rights-of-Way:"
http://www.epa.gov/pesticides/grants/eei_integrated_mgmt.htm.

Utility Arborists Association. "Resources and References for Good Management Practices:"
<http://www.utilityarborist.org/images/NERC%20Resources%20%20References.pdf>.

Vermont Electric Power Company. for Vermont Electric Power Company, Utility Transmission Forestry Herbicide Use Summary Records, 1980s-2010.

Wessels, Tom. Reading the Forested Landscape; A Natural History of New England.
Woodstock, VT: The Countryman Press, 1997.

Yahner, Richard H. "Wildlife Response to More than 50 years of Vegetation Maintenance on a Pennsylvania U.S., Right-of-Way," Journal of Arboriculture Vol. 30, No. 2, March 2004: 123.